

**APPLICATION FOR UNITED STATES LETTERS PATENT**

**TITLE:** VACUUM CLEANER ACCESSORIES

**INVENTOR:** Tak-soo KIM

**BLANK ROME LLP  
The Watergate  
600 New Hampshire Avenue, NW  
Washington, DC 20037  
(202) 772-5800  
(202) 572-8398 (facsimile)**

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## VACUUM CLEANER ACCESSORIES

### REFERENCE TO RELATED APPLICATION

This application claims priority to copending Korean Patent Application No. 2003-62497, filed August 8, 2003, in the Korean Intellectual Property Office, which is  
5 entirely incorporated herein by reference.

### FIELD OF THE INVENTION

The present invention relates to a vacuum cleaner, and more particularly, to a vacuum cleaner with accessories clamped to a connection member, wherein at one end the connection member interconnects an extension pipe to which a suction brush is  
10 coupled, and at the other end, a flexible hose is coupled to a dust-collecting chamber of the main body of the cleaner.

### BACKGROUND OF THE INVENTION

As shown in Fig. 1, a general vacuum cleaner includes a vacuum cleaner body  
10 and a vacuum generation device (not shown) for producing suction power. An  
15 operational grip 20 for user operations is connected at one end to a flexible hose which is detachably coupled to the vacuum cleaner body 10. A floor nozzle 35 is in contact with a cleaning surface and is used for suctioning dust and dirt from the cleaning surface, and is detachably coupled to an extension pipe 25. The extension pipe 25 which is detachably coupled to the other end of the operational grip 20.

20 Furthermore, the vacuum cleaner has a variety of accessories, in addition to the floor nozzle 35, for performing cleaning tasks and are dependent upon the types of cleaning surfaces. For example, if cleaning corners or crevices, a user can separate the floor nozzle 35 from the extension pipe 25, and replace the floor nozzle 35 with a crevice cleaning tool 31 or a brush tool 33, to perform efficient cleaning tasks. In

addition, the extension pipe 25 has an accessory storage device 30 installed or formed to house the crevice cleaning tool 31 and the brush tool 33.

The accessory storage device 30 includes a plurality of prongs 34 that are formed to detachably mount the brush tool 33 and the crevice cleaning tool 31 thereon.

5       The operations of the general vacuum cleaner with a structure as outlined above are described below.

First, if electric power is applied to the vacuum cleaner, the body 10 generates a suction power by which air containing dust and dirt from the cleaning surfaces is 10 suctioned through the floor nozzle 35. The suction air is collected in the vacuum cleaner body 10 via the extension pipe 26, the operational grip 20, and the flexible hose 15.

If a user encounters certain cleaning areas such as narrow crevices or corners, the user detaches the floor nozzle 35 from the extension pipe 25, removes the brush tool 33 or the crevice cleaning tool 31 from the accessory storage device 30 of the 15 extension pipe 25, and connects the brush tool 33 or the crevice cleaning tool 31 to the extension pipe 25.

Hence, the user cleans the crevices, corners, or any areas where the floor nozzle 35 cannot reach by using the crevice cleaning tool 31 or the brush tool 33.

However, the conventional vacuum cleaner with the associated accessories has 20 a problem in that the vacuum cleaner has a storage space provided in the interior of the body thereof to store the accessories such as the crevice cleaning tools or the brush tool 33 or has an extra member provided to mount thereto as the storage device. In particular, a situation where the storage device 30 as shown in Fig. 1 is used, the accessory storage device 30 is engaged as an extra member with the extension pipe by 25 screws, clips, or the like, which creates a problem in that the accessory storage device 30 may be damaged during cleaning tasks.

Thus, a heretofore unaddressed need exists in the industry to address the aforementioned deficiencies and inadequacies.

## SUMMARY OF THE INVENTION

Accordingly, it is an aspect of the present invention to provide a vacuum cleaner with an improved structure to integrally form an accessory storage clip with a connection member for interconnecting an extension pipe and a flexible hose.

5        In order to achieve the aspect of the present invention in a vacuum cleaner with an extension pipe connected to a suction brush and forming a suction passage by connecting the extension pipe with a cleaner body, the vacuum cleaner includes a connection member body with one end connected to the extension pipe. The other end of the connection member body is connected to a flexible hose which in turn is  
10      connected to the cleaner body via a clamping part which is integrally formed with the connection member body.

According to a preferred embodiment of the present invention, the connection member body preferably includes an extension pipe fixing portion to which the extension pipe is connected, and a flexible hose coupling portion flexibly coupled with  
15      the flexible hose. The extension pipe fixing portion and the flexible hose coupling portion can be integrally formed in a mold. The flexible hose coupling portion can have recesses periodically formed in a certain interval on its outer periphery to create flexibility. The clamping part preferably includes a clamping arm by elastically clamping an accessory.

20        The clamping arm can include an inner peripheral surface formed in cooperation with an outer shape of the to be clamped accessory and, preferably, a cross section of the clamping arm when cut in a plane vertical to air flow passing through the connection member, includes an opening formed by cutting off a part of a virtual circle corresponding to an outer periphery of the accessory with a cylindrical shape. The  
25      opening is preferably formed symmetrical with respect to a portion to which the

clamping arm is connected to the connection member. The clamping arm preferably includes a plurality of guide protrusions formed to guide entry of the accessory through the opening. The guide protrusions can be formed by bending the open end portions of the clamping arm.

- 5        Other systems, methods, features and advantages of the present invention will be or become apparent to one with skill in the art upon examination of the following drawings and detailed description. It is intended that all such additional systems, methods, features, and advantages be included within this description, be within the scope of the present invention, and be protected by the accompanying claims.

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### BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described in detail with reference to the accompanying drawings in which like reference numerals refer to like elements, and wherein:

- Fig. 1 is a perspective view showing a general vacuum cleaner;
- 5 Fig. 2 is a perspective view showing a vacuum cleaner having an accessory clamping part according to an embodiment of the present invention;
- Fig. 3 is a view showing the clamping part of Fig. 2; and
- Fig. 4 is a cross-sectional view taken along line IV-IV of Fig. 3.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinafter, descriptions will be made on a vacuum cleaner according to a preferred embodiment of the present invention with reference to the accompanying drawings.

5       A vacuum cleaner shown in Fig. 2 and further detailed in Fig. 3 according to the present invention has a structure with an extension pipe 102 connected to a suction brush 101. The extension pipe 102 is coupled to one end of a connection member 200. The other end of the connection member 200 is coupled to a flexible hose 103 which is further connected to a cleaner body 105. In this embodiment, the connection  
10 member 200 and the extension pipe 102 are connected by a handle pipe 104 bent at a certain angle to serve as a grip.

The connection member 200 includes a connection member body 210 coupled to the extension pipe 102 and a clamping part 220 integrally formed with the connection member body 210 to clamp an accessory 106.

15       The connection member body 210 has an extension pipe fixing portion 211 wherein the handle pipe 104 is coupled, and a flexible hose coupling portion 212 flexibly coupled with the flexible hose 103. Preferably the extension pipe fixing portion 211 and the flexible hose coupling portion 212 are integrally formed in a mold.

20       The extension pipe fixing portion 211 is connected to the handle pipe 104 and firmly secures the extension pipe 102 thus allowing a user to perform cleaning tasks in stable movements.

25       The flexible hose coupling portion 212 has recesses periodically formed in a certain interval on the outer peripheral surface to provide flexibility. Preferably, the recesses are grooves with certain length and depth, a rectangular shape, and are repeatedly formed on the outer peripheral surface of the connection member body 210

in a pattern as shown in Fig. 3. The flexible hose coupling portion 212 has flexibility due to the repetitive pattern of the grooves 213 which prevents the couplings from releasing albeit to deformations such as the bending of the flexible hose 103. The clamping part 220 has a clamping arm 221 elastically clamping the accessory 106.

5 As shown in Fig. 3 and Fig. 4, the clamping arm 221 can be formed to include an inner peripheral surface corresponding to an outer shape of the accessory 106 to be stored within. As shown in Fig. 4, the cross section of the connection member 200 cut in a plane vertical to air flow passing through, preferably has an opening 221a formed by cutting off a part of a virtual circle corresponding to the outer periphery of  
10 the accessory 106 with a cylindrical shape.

In this embodiment, the opening 221a is formed preferably symmetrical with respect to a portion J where the clamping arm 221 and the connection member are joined.

The front side of the clamping arm 221 towards the extension pipe fixing  
15 portion 211 is slanted at an angle of which the accessory 106 can be easily mounted. In addition, the clamping arm 221 may have guide protrusions 222 formed to guide the entry of the accessory 106 through the opening 221a.

As shown in Fig. 4, the guide protrusions 222 are formed preferably by bending the open end portions of the clamping arm 221 to form the opening 221a.  
20 An inner angle  $\alpha$  outlining the respective guide protrusions is formed by bending, preferably in ranges from  $70^\circ$  to  $90^\circ$ . If the internal angle  $\alpha$  is too large, the accessory 106 is easily released, and, if the internal angle  $\alpha$  is too small, it is difficult to store the accessory 106. Therefore, it is preferable to maintain the internal angle  $\alpha$  in the appropriate range as indicated above.

25 Hereinafter, together with Fig. 2, a description follows on a method for storing the accessory 106 on the vacuum cleaner according to the present invention.

The accessory 106 for cleaning diverse places such as crevices or quilts is stored in the clamping arm 221 which protrudes underneath the connection member 200, as shown in Fig. 2. When a user intends to access the accessory 106, the user pulls the accessory 106 in the ‘arrow’ direction of Fig. 2, causing both sides of the

5 clamping arm 221 to elastically deform, thereby releasing the accessory 106 through the opening 221a in a downwards orientation. Accordingly, the user can release the stored accessory 106 only by pulling the accessory 106. When the user stores the accessory 106 through the opening 221a, again after use, the user pushes the accessory 106 in through the opening 221a to elastically deform the clamping arm 221, thus

10 allowing the accessory 106 to be stored in the clamping part 220. At this time, the guide protrusions 222 guide the outer periphery of the accessory 106 in order for the accessory 106 to be more easily inserted, promoting the insertion direction of the accessory 106.

Hence, the user can freely store the accessory 106 without providing an extra

15 accessory storage device, and, since the clamping part 220 used for storing the accessory is provided on the connection member 200 and interconnects the extension pipe 102 and the flexible hose 103, cleaning tasks are not obstructed by the stored accessory 106 interfering with furniture or other obstacles located near a cleaning surface during the tasks.

20 The vacuum cleaner as described above can easily store the accessory since it has an accessory storage clip integrally formed with the connection member for interconnecting the extension pipe and the flexible hose. Thus, no extra clip for storing the accessory is needed. The claimed invention prevents the accessory from interfering with furniture and the like during cleaning tasks since the accessory is

25 stored in the connection member which interconnects the flexible hose and the extension pipe.

Although the preferred embodiment of the present invention has been described, it will be understood by those skilled in the art that the present invention should not be limited to the described preferred embodiment, but various changes and modifications can be made within the spirit and scope of the present invention as defined by the appended claims.